

A Space Blockade Flexible and Responsive Denial of Adversary Use of Space

3 Apr 2001

**Major Rob Fabian
HQ AFSPC/XPXY
Tom Riebe
Litton TASC**

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 03-04-2001		2. REPORT TYPE Conference Proceedings (Briefing)		3. DATES COVERED (FROM - TO) 03-04-2001 to 05-04-2001	
4. TITLE AND SUBTITLE A Space Blockade Flexible and Responsive Denial of Adversary Use of Space Unclassified				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Fabian, Rob ;				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME AND ADDRESS HQ AFSPC/XPXY XXXXX XXXXXX, XXXXXXXX				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS Lincoln Laboratory Massachusetts Institute of Technology 244 Wood Street Lexington, MA02420-9108				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT APUBLIC RELEASE					
13. SUPPLEMENTARY NOTES See Also ADM001334, Proceedings of the 2001 Space Control Conference (19th Annual) held in Lincoln Laboratory, Hanscom AFB, MA on 3-5 April 2001.					
14. ABSTRACT ? Military Value of Space ? Space Threat ? The Problem? ? The Answer? ? Space Blockade Process ? Conclusions					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT Public Release	18. NUMBER OF PAGES 30	19. NAME OF RESPONSIBLE PERSON Fenster, Lynn lfenster@dtic.mil	
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified		19b. TELEPHONE NUMBER International Area Code Area Code Telephone Number 703767-9007 DSN 427-9007	
				Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std Z39.18	



Disclaimer

Opinions expressed in this briefing are solely those of the authors. This briefing does not represent the views, policies, or plans of Litton TASC, any other corporation, the United States Air Force, the Department of Defense, or the United States Government



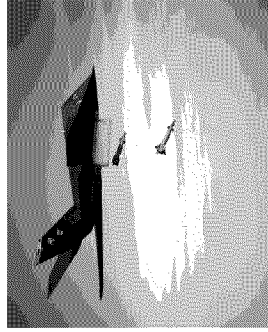
Overview

- **Military Value of Space**
- **Space Threat**
- **The Problem?**
- **The Answer?**
- **Space Blockade Process**
- **Conclusions**

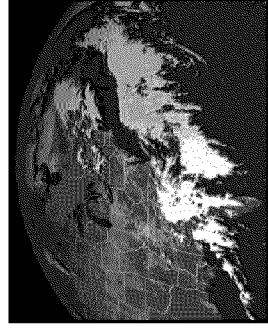


Introduction

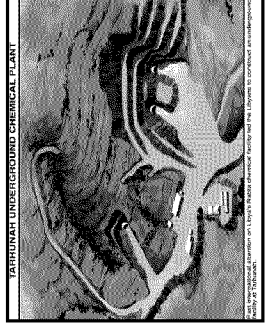
- Precision Navigation for Field Maneuvers and PGMs
- Reliable Global Communications Links In the Field
 - Reach-back is a way of life in the modern military
- Space-based weather forecasting made airpower more effective in **OPERATION ALLIED FORCE** - Unclassified Kosovo After Action Report
- Detailed World-wide Battlefield Reconnaissance
 - Improved knowledge of target area and adversary activities
- Missile Warning Played Essential Role in **DESERT STORM**



**Precision
Navigation**



**Weather
Prediction**



Reconnaissance



Communications

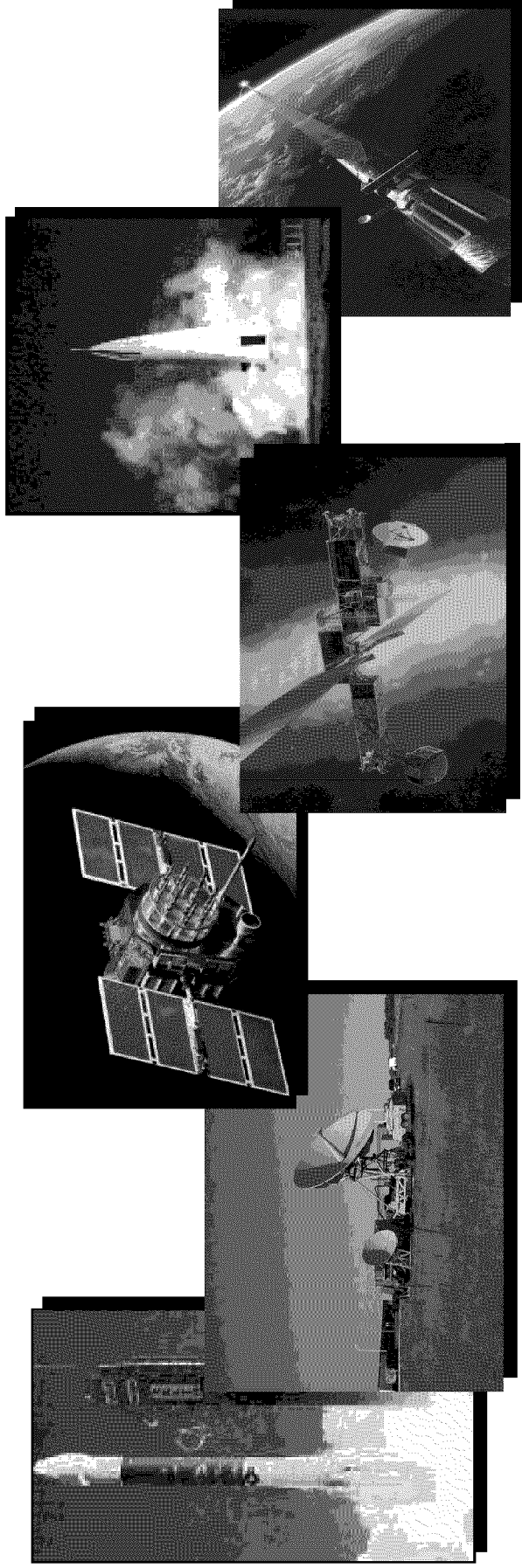


**Missile
Warning**



Introduction

**“Space support was instrumental to our success.
Reliance on space continues to grow in our
military operations.” - Unclassified Kosovo After Action Report**



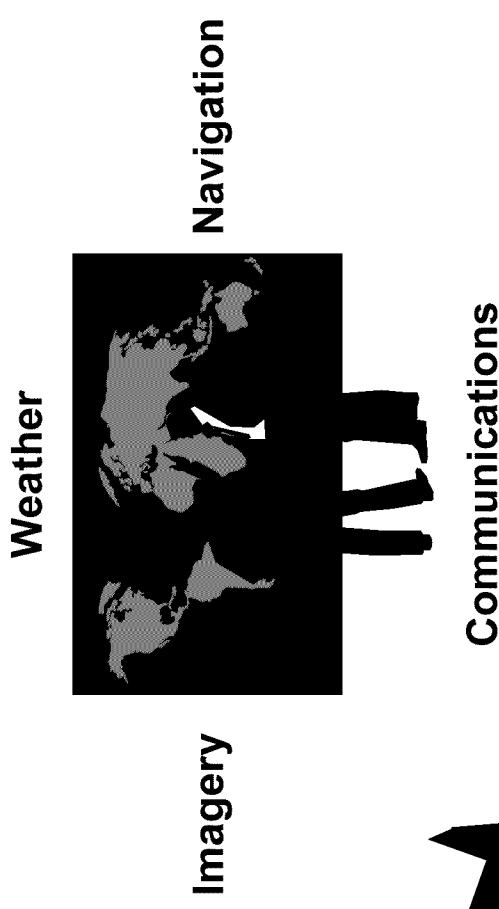
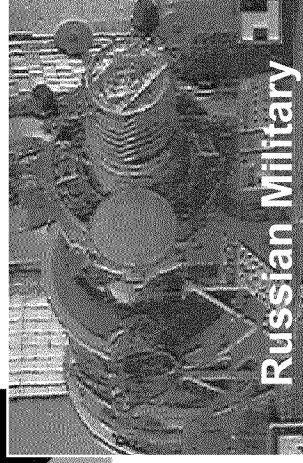
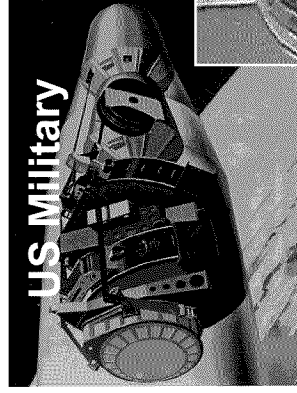
***Potential adversaries can see this too...
And Learn From It!***



The Changing Nature of Space

Yesterday's World

- Ground-breaking technology
- Directed by government
- Driven by military needs
- Cold War Superpower use
- Largely military applications
- State-of-the-art military



Today's World

- Proven technology
- Directed by entrepreneurs
- Driven by commercial needs
- Global availability & use
- National, Consortia, Comc'l
- Fee for service



Space Threat

This Has Started To Level The Playing Field



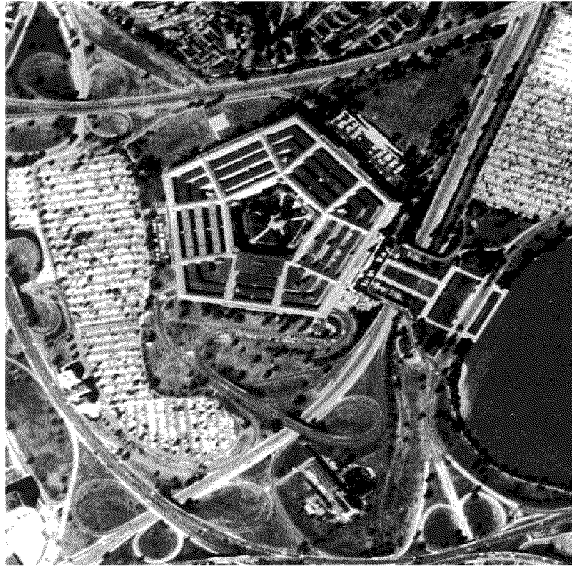
Imagery

- **“A picture is worth a thousand words...”**
- **No Longer the Sole Purview of Superpowers**
 - **Diverse National Imaging Programs:**
(Japan, China, India, Israel, Brazil, Canada, Great Britain and France)
 - **Private Corporate ventures**

Anyone can buy satellite imagery better than Lyndon Johnson had when he was President...



Imagery



The Pentagon, Washington, DC on 25 Sep 67

2.7 m ground resolution

Commercially Available Today

1 m ground resolution

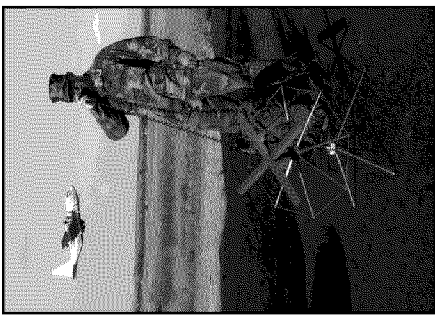


Kirtland ANG F-16 Ramp Civil Aviation Ramp



Communications

- **One of the Earliest Applications**
- **One of the Easiest**
- **Widely Available Commercial Services**
- **Even Small, Poor Countries Participate**
- **High Quality, Reliable Comm**
- **Handsets Available**
- **Decentralized -- Often No Local Nodes**





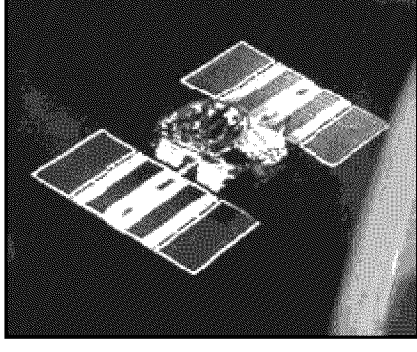
Precision Navigation

- **Classic Military Questions:**

“Where am I?”

“Where are my buddies?”

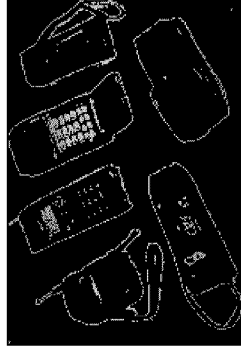
“Where are the bad guys?”



- **Two of 3 Answered**

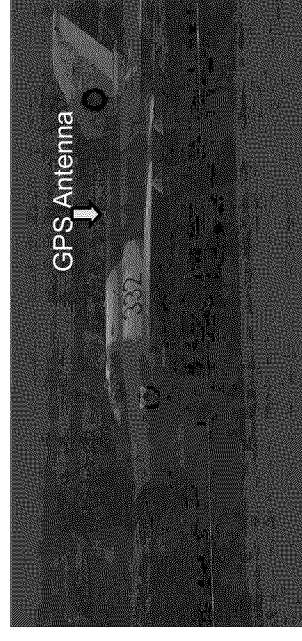
- **Wal-Mart sells systems adequate for:**

- Fire Control
- Crude “Advanced” Weapons Options



- **GLONASS Operational**

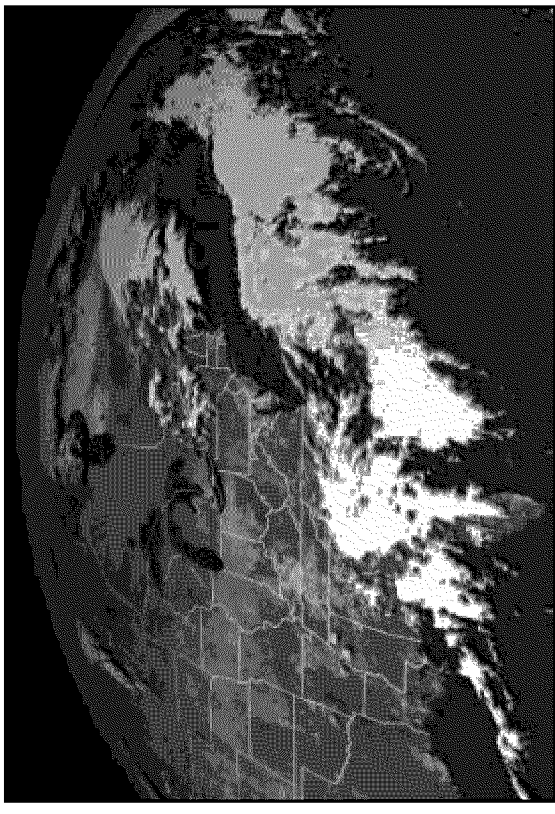
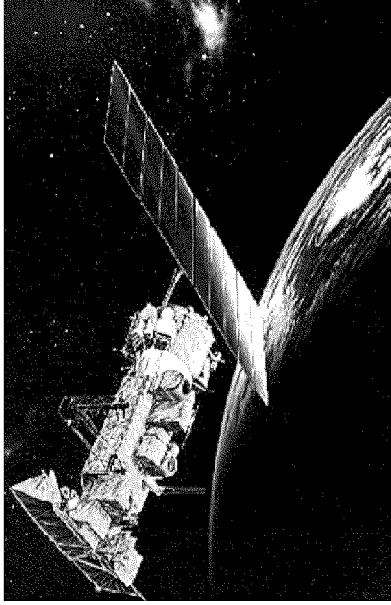
- **Galileo On The Horizon**





Weather

- **Space-Based Weather Imagery a Staple**
- **Unencrypted -- Available to Anyone**
 - **On Cable TV**
 - **On the Internet**
 - **Full High Quality Forecasts**
- **Of Anywhere on Earth**





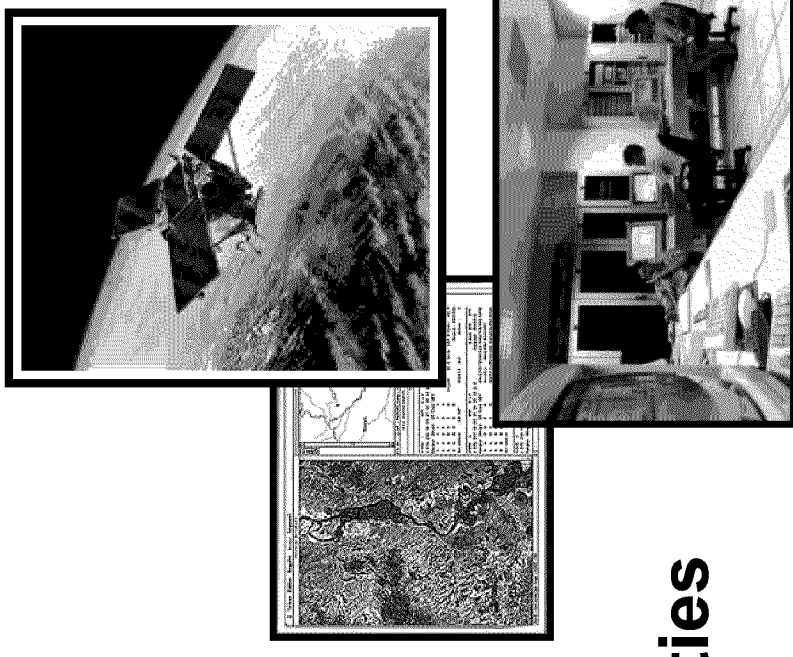
Rise of Commercial Space

- **Until mid 1990's Government Principal Owners/Operators**
- **Two Fundamental Operational Models**
 - **Access Only By a Select Few (Military Comms, etc.)**
 - **Access To All (GPS, Weather, etc.)**
- **Commercial Approach: Fee For Service**
 - **Technology Investment No Longer Necessary**
 - **Industrial Base No Longer Necessary**
 - **Ownership No Longer Necessary**
- **Purchase SERVICES As Needed**



So What?

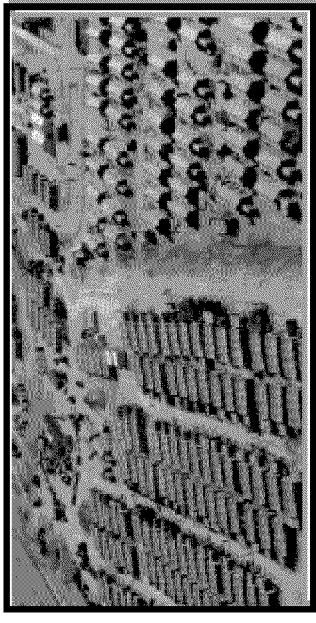
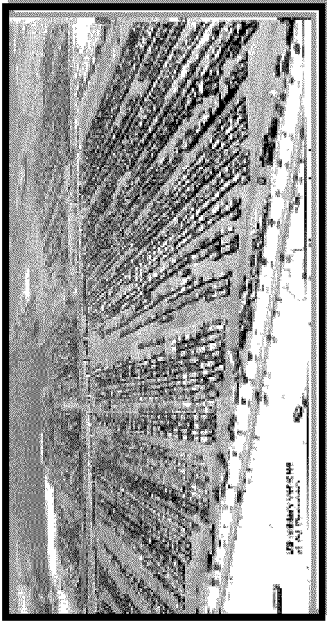
- **With Imagery Alone--Adversary Knows:**
 - Positioning
 - Force Structure
 - Movements
 - Weaknesses
- **Surprise is HARD!**
- Heavy Equipment Losses
- Eight-fold Increase In Casualties
- **Enemy Can Counter Your Moves**



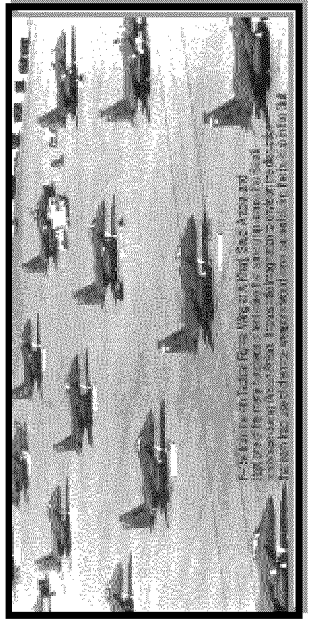
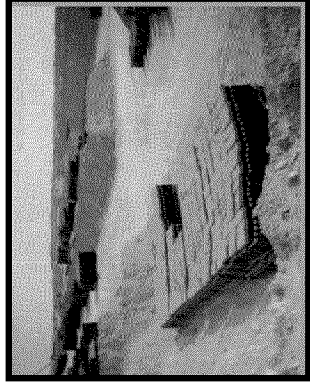
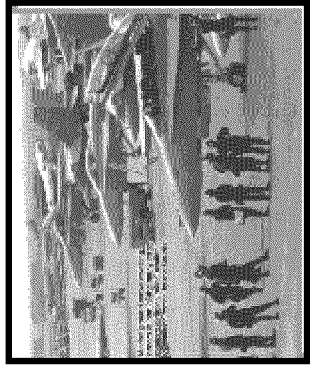


Vulnerability to “Eyes in Space”

“We’d jammed so many aircraft into Riyadh... that it looked like the deck of an aircraft carrier: ...Every time I flew into or out of that airport I’d think, ‘If one enemy aircraft were to get through & hit this place...’ The secondary explosions alone would have destroyed the entire fleet.”



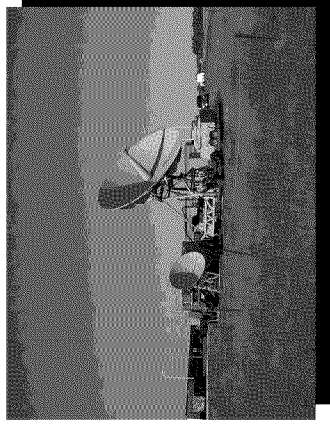
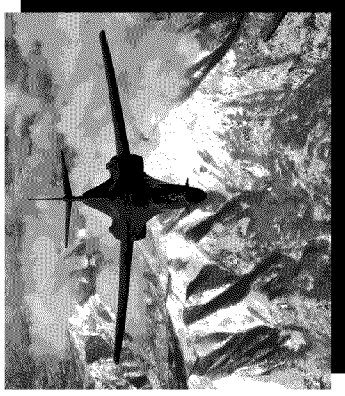
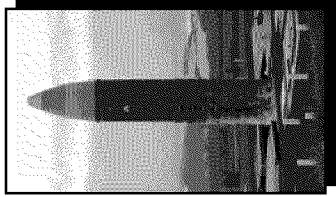
Gen H. Norman Schwarzkopf





So What?

- **US Strategy of “Strategic Paralysis”**
 - **Attack the Mind of the Adversary Commander**
 - **Eliminate His Ability To Talk To His Troops**
 - **Mobile SATCOMM can end-run our efforts**
- **Precision Navigation Allows:**
 - **Maneuver In Unfamiliar Territory**
 - **Precision Strikes**





Direction

National Security Strategy:

We will “...maintain the ability to counter space systems and services that could be used against our ground, air, and naval forces, our command and control systems, or other capabilities critical to national security.”



Direction

President's National Space Policy (NSC-49, NSTC-8, 14 Sep 96)

Directs DoD to conduct space control activities to include:

- **Offensive Counterspace (OCS)**
 - “Countering, if necessary, space systems and services used for hostile purposes”
- **Defensive Counterspace (DCS)**
 - “Assuring that hostile forces cannot prevent our own use of space”
- **Space Situational Awareness**
 - Maintaining “Space surveillance, BMC3, and intelligence to effectively detect, track, categorize, monitor, and characterize threats to U.S. and friendly space systems”



Debated Question

- Is it necessary to keep an adversary from exploiting space?
- If Yes, then the question is:

“How should we go about doing it?”
- Denial of adversary owned systems is relatively straight forward but...

How do we deny access to third-party systems?



Traditional Blockade Definitions

- **Historic Definition:**

The closure of an area, such as a city or harbor, by hostile forces so as to prevent entrance and exit of traffic and communication.

- **Naval Definition:**

A belligerent operation intended to prevent all vessels of all states from entering or leaving specified coastal areas which are under the sovereignty, under the occupation, or under the control of an enemy.

- **No-Fly Zone**



Space Blockade Definition

**A belligerent operation to prevent
access to space services, both neutral
and enemy, within an area under
enemy control**



Blockade Forces

- **Deterrent Value of “Risk of Loss”**
 - **Do Not Have To Be Able To Stop Them All At Once**
- **Blockading Nation Must:**
 - **Field Force To Enforce Blockade**
 - **Present An Open & Credible Force**
 - **Actually Use Forces If Needed**



Space Blockade Issues

- **Can Not ‘Turn Back’ A Satellite**
 - Significant costs to constant maneuvers
- **Unilateral Destruction May Not Be In U.S. Best Interests**

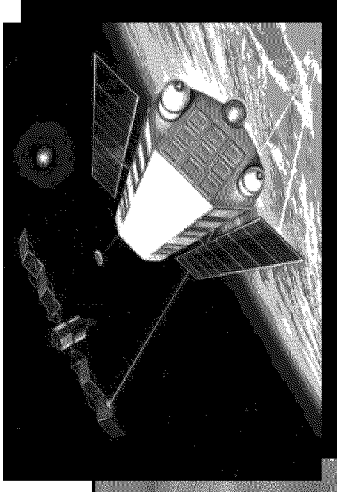
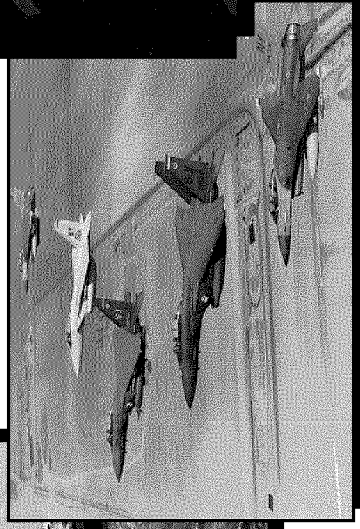
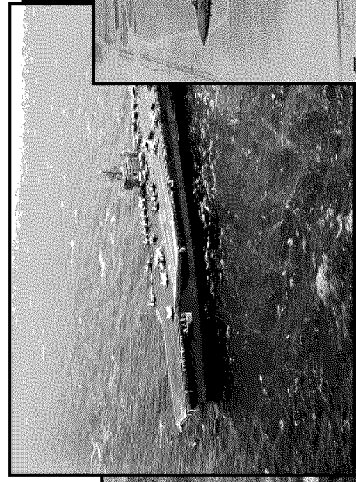
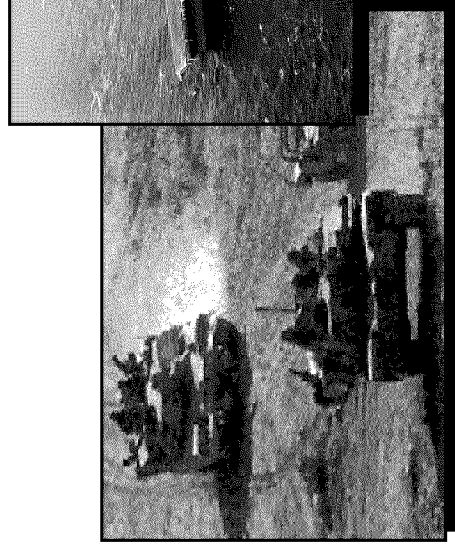
BUT...

- **Space Services Are Based On Information, Not Physical Presence**
 - Stop the info, you’ve stopped the service



Blockade Process

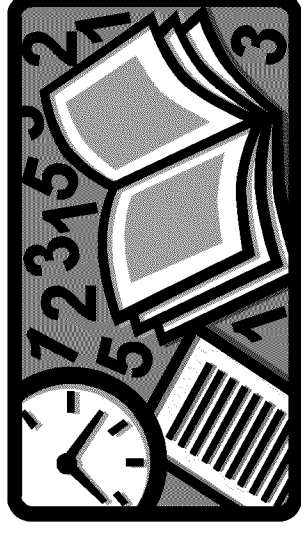
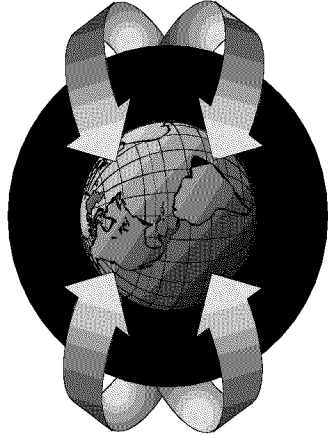
- **Blockade Declaration** *(Tell 'em)*
- **Deployment of Forces** *(Weigh Anchor)*
- **Voluntary Compliance** *(Watch For Runners)*
- **Reversible Enforcement** *(Board/Turn Back)*
- **Lethal Enforcement** *(Sink 'em)*





Blockade Declaration

- **Blockade Announcement Includes**
 - **Start Date**
 - **Geographic Coverage**
 - **Systems Covered**
 - **Acceptable Demonstration of Compliance**
 - **Exceptions**
- **Allows Neutrals Time To Plan/React**





Deploy Forces

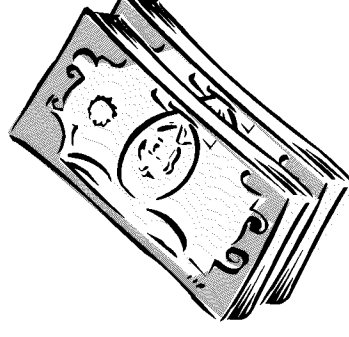
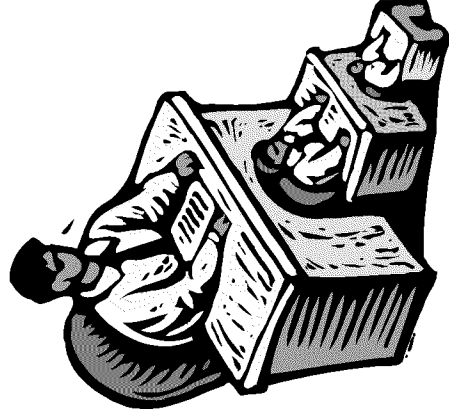
- Must Deploy Blockade Forces
- “Paper Blockade” Is Invalid
- AFSPC Strategic Master Plan Lists Potential Forces:

	ISR		COMM		NAV	
	Rev	HK	Rev	HK	Rev	HK
Mobile RF Jammer			X			
Laser Blinder	X					
Navigation Jammer					X	
Downlink Jammer	X		X			
CS Microsats	X		X	X		
Spacebased Laser		X		X		X



Voluntary Compliance

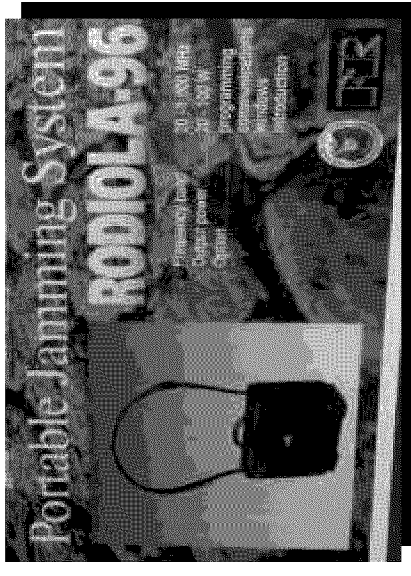
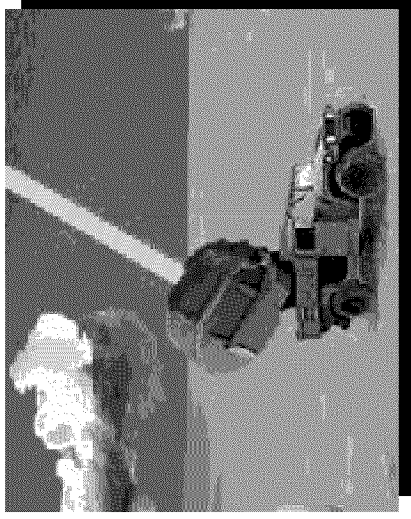
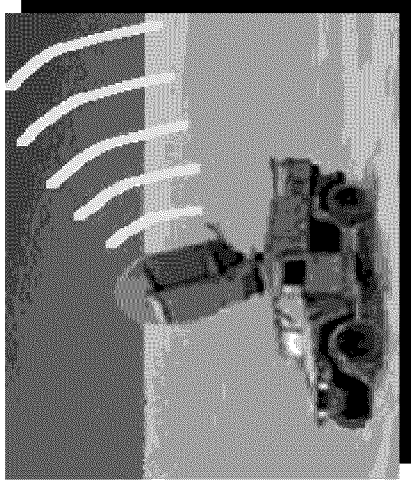
- **Voluntary Compliance Pursued Through**
 - **Regulations**
 - **Diplomatic Channels**
 - **Economic Means**
- **Best Outcome -- No Force Applied**





Reversible Enforcement

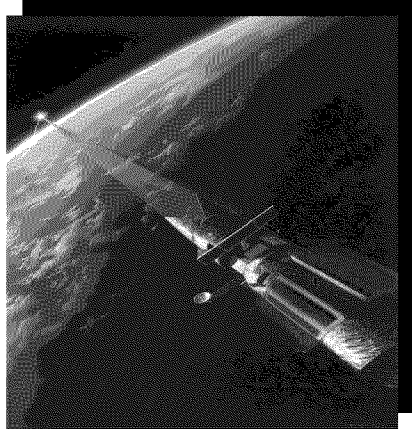
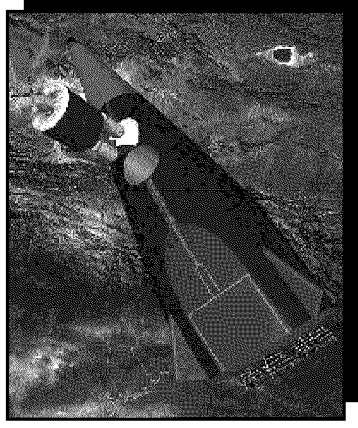
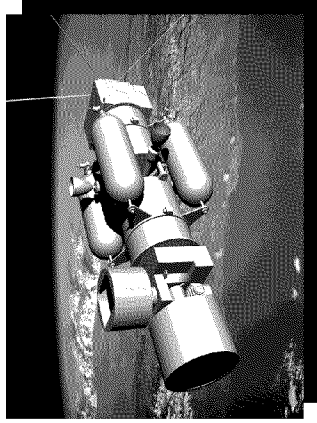
- **First & Best Force Option**
 - Clear Warning Of Intent
 - Serves AS Notice Of More Aggressive Options
 - Warns All Parties, Not Just The One Targeted
- **Nothing Permanently Harmed - No Loss Of Capital**





Lethal Enforcement

- Target Space Vice Ground Systems First
 - Proportionality Holds
 - No Direct Loss Of Civilian Life
 - Ground Systems May Be In Neutral Or Allied Countries
- Encourages Targeted Organizations To Cooperate





Conclusion

A Space Blockade Provides A Reasonable Framework For Cutting An Adversary Off From Space Support With Minimal Damage To Third- Party Providers

